SYDOW'S MONOGRAPHIA UREDINEARUM, WITH NOTES UPON AMERICAN SPECIES.

J. C. ARTHUR.

The laudable attempt to describe and illustrate uniformly all known species of the *Uredineae,* undertaken by P. and H. Sydow,* has progressed to the completion of the first volume. This volume contains 1226 species, all so far known under the genus *Puccinia,* and a much larger number than the size and complexity of the family would seem to warrant. But all criticism regarding the accepted boundaries of the genus may well be laid aside in view of the successful manner in which the work of describing the species has been carried out. Nevertheless, one can not help regretting that the wholly unlike, and but distantly related, genus *Uropyxis* should have been engulfed in this maelstrom of two-celled spores, after it had been so clearly shown by Magnus to be distinct. Except as part of the useful Sylloge by Saccardo, which attempted little more than to collate published accounts of the species, no systematic and uniform treatment of all known species of this large family has ever been undertaken. The present work has entailed an enormous amount of labor. In citation of literature, in collation of items regarding hosts and geographical distribution, and in verifying and unifying the diagnoses, evident care has been exercised, and a large degree of accuracy attained. Nearly half the species are illustrated with original outline drawings. The authors state that to accomplish this work they examined some 30,000 specimens. We may well believe them when they say that "wir haben mit voller Lust und Liebe an dem Werke gearbeitet"; and the reward of well merited success should be theirs.

The thirty pages of the introduction contain much descriptive, historical and statistical information. A very interesting list is given of authors of new species, with the number of species which they described each year from the time of Persoon, 1794, to the present time. In the matter of geographical distribution one is naturally surprised to find that just twice as many endemic species are credited to America as are found in Europe. One fourth of all the species inhabit the *Compositae,* and one eighth of them occur on the *Gramineae.* The six families which support the next largest number of rusts are *Umbelliferae* with 88 species, *Cyperaceae* with 53, *Liliaceae* with 47, *Labiatae* with 45, *Rubiaceae* with 38, and *Ranunculaceae* with 36.

Sydow, P. and H.— Monographia Uredinearum seu specierum omnium ad hunc usque diem descriptio et adumbratio systematica. Volume I, Genus Puccinia, cum XLV tabulis. Lipsiæ, Fratres Borntræger, 1904. pp. xv+972. 8vo.

The arrangement of the text and indices is excellent. The illustrations are helpful, although usually confined to the teleutospores and drawn with a freer hand than seems either necessary or desirable. The serial numbering of the illustrations is bad. If each one had been given the text number of the species, it would greatly have facilitated their use.

The most notable advance, which this work shows in the grouping of the species, is their segregation according to hosts. It can not be said that this method indicates relationship, but it is a fine safeguard against the confusion of species having teleutospores of similar appearance. The Schroeterian classification, based on the number of spore-forms in the species and their behavior, was wisely discarded.

No one believes that such a work can be perfect; errors must necessarily creep in, due to many causes, even if, as in the present case, every reasonable care has been exercised by the authors to insure accuracy. The following notes upon the American species are not to be taken, therefore, as a criticism of the work, but as a contribution to the subject. Much of what is here given has been learned through recent studies, and constitutes heretofore unpublished information. The species are taken up in the order adopted in the work, and the text numbers are retained for ready reference.

No. 6. PUCCINIA CORNIGERA E. & E. should be made a synonym of *P. Actinellae* (Webb.) Syd.

No. 10. PUCCINIA LONGIPES Lagh. should be made a synonym of *P. Vernoniae* Schw. This name is founded upon an error. Schweinitz described *P. bullata* from dead stems "variarum plantarum v. c. Ambrosiae, Chenopodii" (Syn. Fung. Car. p. 74), which statement was copied by Link (in Linné, Sp. pl. 6^2:75). In his later work (Fungi of N. Amer. p. 295) Schweinitz gives the host for this species as "Vernonia novaeboracensis," a correction which Lagerheim and others seem to have overlooked. This caulicolous form of the species with its extraordinarily large sori is not infrequently collected, but almost always on dead stems, where the contrast of color makes it conspicuous. No rust has ever been found on the stems of either *Ambrosia* or *Chenopodium.*

No. 13. PUCCINIA APLOPAPPI Syd. is a synonym of *P. tuberculans* E. & E. The differences noted by the author are only the natural variation of the species, due to changed environment.

No. 17. PUCCINIA SIMILIS E. & E. is a synonym of *P. Absinthii* DC. The aecidia described are undoubtedly a part of the species. No aecidia are described under *P. Absinthii,* although this stage belongs to the species.

No. 19. PUCCINIA RECONDITA D. & H. belongs under *P. conferta* D. & H. This species is also found in Washington, New Mexico and Oklahoma.

No. 26. PUCCINIA MAGNOECIA E. & E. The only character that definitely separates this species from *P. Asteris* Duby is the large sorus, and even this sometimes shows all gradations to the small sorus. The type of the species which is in the herbarium of the N. Y. Botanical Garden has recently been examined at my request by Dr. Rydberg and Professor Earle, and is found to be *Aster Cusickii* A. Gr., not *A. pulchellus*, as heretofore supposed. The form with large sorus is found upon other species of aster, however, and is essentially the same in appearance as *P. Gerardii* Pk., which is no longer maintained as a separate species. It can not be foretold what cultures, and more extended study, may develop, but at present there seems to be no good reason for maintaining the forms with large sori as separate species.

No. 62. PUCCINIA CYANI (Schleich.) Pass. has recently been found in the United States by Charles H. Peck at Menands, N. Y. (see Rep. N. Y. St. Mus. for 1903:25).

No. 49. PUCCINIA CICHORII (DC.) Bell. was found at Burlington, Vt., Aug. 11, 1898, by T. E. Hazen, and at Oaks Corners, N. Y., Sept. 16, 1904, by H. S. Jackson.

No. 76. PUCCINIA ENDIVIAE Pass. was reported from this country last year, having been collected at Hamden, Ct., Oct. 14, 1903, by G. P. Clinton (Rep. Conn Exper. Sta. for 1903:321).

No. 80. PUCCINIA INCLUSA Syd. is a synonym of *P. Cirsii* Lasch, without any doubt, as in fact the authors indicate in the appendix.

No. 82. PUCCINIA CALIFORNICA Diet. is also a synonym of the variable species *P. Cirsii* Lasch.

No. 122. PUCCINIA CONFLUENS Syd. is but an incidental variation of *P. Erigerontis* E. & E. The species has also been collected on *Erigeron Eatoni* at Laramie Hills, Wyo., Aug. 8, 1901, by Aven Nelson, and on *E. microlonchus* at Willow Creek, Wyo., July 1, 1898, by Elias Nelson.

No. 141. PUCCINIA GUTIERREZIAE E. & E. is a synonym of *P. Grindeliae* Pk.

No. 173. PUCCINIA LAGOPHYLLAE D. & H. should be made a synonym of *P. Hemizoniae* E. & T.

No. 197. PUCCINIA NARDOSMIAE E. & E. appears to be a synonym of *P. conglomerata* (Str.) K. & S. The host genus is very closely related to *Homogyne*, on which the European rust has been collected, and the fungus from the two countries does not appear to differ.

No. 231. PUCCINIA EXPANSA Lk. This species has not yet been found in America. The collection on *Senecio lugens* from California (Sydow, Ured. No. 782) referred to under this species belongs to *P. subcircinata* E. & E.

No. 241. PUCCINIA TRACYI Sacc. & Syd. is undoubtedly a synonym of *P. Solidaginis* Pk. The differences in appearance of the sori and spores are such as are found in all leptopuccinious species, and are due in part to the changes in structure which are correlated with the germinating or resting condition, for all such species possess the double physiological role of summer spores and winter spores. The apical walls of this species vary from quite thin and rounded to enormously thickened and beaked.

No. 268. PUCCINIA VERBESINAE Schw. was described originally from material collected in South Carolina, on "Verbesina, Siegesbeckia et aliis." These host names cover *Verbesina occidentalis* Walt., *Siegesbeckia occidentalis* L., and *Verbesina Siegesbeckia* Michx., all referring to the same species, and now generally known under the first name. So far in my studies I do not find that the true *P. Verbesinae* Schw. has been reported upon any other than the type host. Its range is the southeastern United States, from West Virginia to Alabama. All other hosts cited by Sydow under this number should be referred to the preceding species *P. cognata* Syd. The latter species ranges from Texas southward through Mexico, and is distinguished from the eastern species by somewhat larger spores of all kinds, and by teleutospores more inclined toward clavate, paler, and with persistent pedicels. The South American *P. Schileana* may belong with the number following, but unquestionably does not belong here.

No. 290. PUCCINIA XYLORRHIZAE Arth. Since the publication of this species, collections have been received from other stations in Wyoming, one of which from Yellowstone Park, Aug. 30, 1899, No. 6780 (Aven Nelson), was distributed as *P. Asteris*, on *Aster* sp. Another collection on the same host was made by T. D. A. Cockerell, Sept. 24, 1902, at Las Vegas, N. M., and sent out as on *Senecio sp.* The colorless cells found in the sorus, which I at first called pseudospores, I now believe to be remnants of a peridium. Many species produce teleutospores within the aecidial cup, from the same mycelial mass that gave rise to the aecidiospores, and I see no objection to the view that in this species the aecidial stage is represented by a few loose peridial cells, and the uredinial stage by a few loose uredospores.

No. 459. PUCCINIA SALVIAE-LANCEOLATAE Bub., is a synonym of *P. caulicola* T. & G., as the authors have pointed out in the appendix.

No. 504. PUCCINIA DICHONDRAE Mont. occurs in southern California, where it was collected at San Diego, March 9, 1882, by M. E. Jones, No. 3040, and in Orange Co., May, 1903, by S. S. Parish, No. 4808. It has also been reported from Mississippi, by Tracy and Earle (Bull. Miss. Exper. Sta. No. 34:85. 1895).

No. 525. PUCCINIA PHILIBERTIAE E. & E. is a synonym of *P. Gonolobi* Rav., as a recent examination by the writer of the type specimen in the herbarium of the N. Y. Botanical Garden has clearly proved.

No. 529. PUCCINIA COMPACTA Kze. also occurs in Porto Rico, W. I. A collection made by A. A. Heller at Aibonito, P. R., March 22, 1899, on *Asclepias curassavica* L., No. 863, was determined by Ellis as *P. concrescens* E. & E., a name I have been unable to trace. Part of this collection sent to Dr. Bubák was compared with type material and pronounced identical with *P. compacta.*

No. 539. PUCCINIA HALENIAE A. & H. has been found in Wyoming on *Gentiana calycosa* Griseb.

No. 588. PUCCINIA CYMOPTERI D. & H. is undoubtedly a synonym of *P. Jonesii* Pk.

No. 595. PUCCINIA ASPERIOR E. & E. is also a synonym of *P. Jonesii* Pk. The two hosts cited, *Ferula dissoluta* and *Leptotaenia dissecta,* both refer to the same species, the former name being a synonym of the latter. Another host, *Ferula multifida,* cited under *P. Jonesii,* should be written *Leptotaenia multifida.*

No. 634. PUCCINIA MICROICA Ellis, was founded upon an erroneously determined host. The type is unquestionably *Cryptotaenia Canadensis,* and the name becomes a synonym of *P. Cryptotaeniae* Pk.

No. 639. PUCCINIA LINDROTHII Syd. is an undoubted synonym of *P. Jonesii* Pk.

No. 640. PUCCINIA SPHALEROCONDRA Lindr. is another synonym of the very abundant and very variable species *P. Jonesii* Pk. This species also occurs on more than a half dozen species of hosts not reported by Sydow. *Aecidium Leptotaeniae* Lindr. is a synonym not mentioned by Sydow.

No. 652. PUCCINIA SCANDICA Johans. has been collected in Utah at 8900 ft. alt., Aug. 16, 1903, by A. O. Garrett, No. 292, on *Epilobium sp.*

No. 992. PUCCINIA THOMPSONII Hume, is a synonym of *P. Bolleyana* Sacc., or what is the more correct name *P. Sambuci* (Schw.) Arth. This connection has been proven by cultures carried out by Prof. Kellerman.

No. 1064. PUCCINIA OMNIVORA E. & E. is a synonym of *P. Windsoriae* Schw. The host was erroneously determined it being in reality *Tricuspis sesleriodes.*

No. 1071. PUCCINIA PROCERA D. & H. is founded on the same species of host, *Elynus condensatus,* as *P. montanensis* Ellis. The former was published in December, 1893, and is clearly a synonym of the latter, which was published in May, 1893. It is probable that neither of these names covers the rust on *Elymus Canadensis* and similar hosts occurring east of the Rocky mountains. Culture experiments have shown that the form on *Elymus Virginicus* has its aecidium on *Impatiens,* and possibly that on *E. striatus,* but not the form on *E. Canadensis,* whose affinities are not at present known.

No. 1086. PUCCINIA MELICAE (Erikss.) Syd. occurs in abundance in the vicinity of Lafayette, Ind., on *Melica diffusa* Pursh. As in Europe, the uredospores are formed in the greatest abundance, but the teleutospores only appear very late in the season.

No. 1087. PUCCINIA MILII Erikss. has been recently reported by Dr. J. J. Davis from Wisconsin. It was found in the uredoform in Vilas Co., Wis., July 11, 1901, on *Oryzopsis asperifolia* Minchx., but it was not until teleutospores were obtained, Sept. 30, 1903, that the determination of the species could be made. It was also gathered by the same collector at Racine, Wis., Aug. 8, 1903, on *Melium effusum* L., showing only the uredo. The American material agrees perfectly with the European, especially with Eriksson's No. 450 in his *Fungi parasitica scandinavici.*

No. 1101. PUCCINIA ESCLAVENSIS D. & H. should be written *P. eslavensis,* there being a clerical error in the original publication. The name is derived from Eslava (not Esclava), the place where the type collection was made.

No. 1147. PUCCINIA STIPAE Arth. is entirely distinct from the European form on *Stipa,* as cultures not yet published have abundantly demonstrated. The names used by Opiz and Hora do not, therefore, apply to the American species, and indeed, are not applicable to the European species, because they are both *nomina nuda.*

No. 1150. PUCCINIA SUBSTERILIS E. & E. is a synonym of *P. Stipae* Arth., for the so-called uredospores are the resting form, or amphispores, of that species.

No. 1157. PUCCINIA AGROPYRI E. & E. Aecidia of this species are known to occur in North America upon *Clematis ligusticifolia* in Colorado, Montana, Wyoming and Nebraska, on *C. Scottii* in Colorado, on *C. lasiantha* in California, on *Fremontii* in Kansas, on *C. Drummondii* in Arizona, and on *C. Viorna* in Iowa. The forms on *C. Virginiana* and *C. Douglasii* do not be-

long with this species. The first name in the Sydow list, *C. angustifolia,* is a clerical error for *C. ligusticifolia.*

No. 1218. PUCCINIA BAKERIANA Arth. is a synonym of *P. Ellisii* De T., and the host is not a species of *Heracleum,* but *Angelica tomentosa.* The error in determination of the host was pointed out by the collector, after publication. Errors like this would not be so frequent if collectors would make more liberal packets, and especially be careful to include whole leaves, parts of stems, inflorescence, etc., so that the mycologist may have some material on which to found a judgment regarding the host as well as the fungus.

In the above notes it has been the attempt to include matters of fact only, and not to introduce questions of opinion or matters not yet fully established. In order to keep this article within reasonable limits, most of the data upon which the statements are based, have been omitted, but it may be assumed that in every instance proof could be supplied by the writer that would meet the approval of Dr. Sydow and other mycologists.

AGARICUS AMYGDALINUS M.A.C.

EDWARD READ MEMMINGER.

As far as our research shows, *Agaricus amygdalinus* has never been technically described, and the first appearance of the name in print was in Curtis's List of the Fungi in the Geological and Natural History Survey of North Carolina published in 1867. It is not surprising, therefore, that so little being known about this species, even its existence has been questioned.

Dr. Farlow, in an interesting paper, entitled "Notes on Agaricus Amygdalinus, M. A. Curtis," published in the Proceedings of the Boston Society of Natural History, Vol. 26, has brought together all the known facts, and to this paper we wish to acknowledge our indebtedness for much that follows. It is our intention, in this paper, to review these facts, and to introduce others that lead us to the opinion that the plant, named *Agaricus amygdalinus* by Curtis, still grows in the Southern States, and is, perhaps, entitled to specific recognition.

We think it susceptible of proof, that this plant was first published by Curtis as *Agaricus fabaceus* Berk., then this determination not proving satisfactory, it was united by Ravenel with Ag. *campestris* Linn.; dissatisfaction still existing it was finally segregated as *Agaricus amygdalinus* by Curtis.

Its first appearance and publication as *Agaricus fabaceus* Berk. was in Silliman's Journal, Vol. 8, 2d Ser., p. 401. "Agar-